

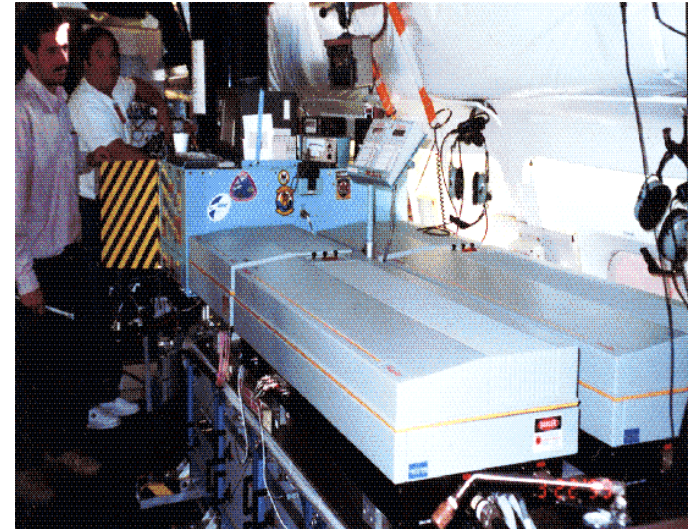
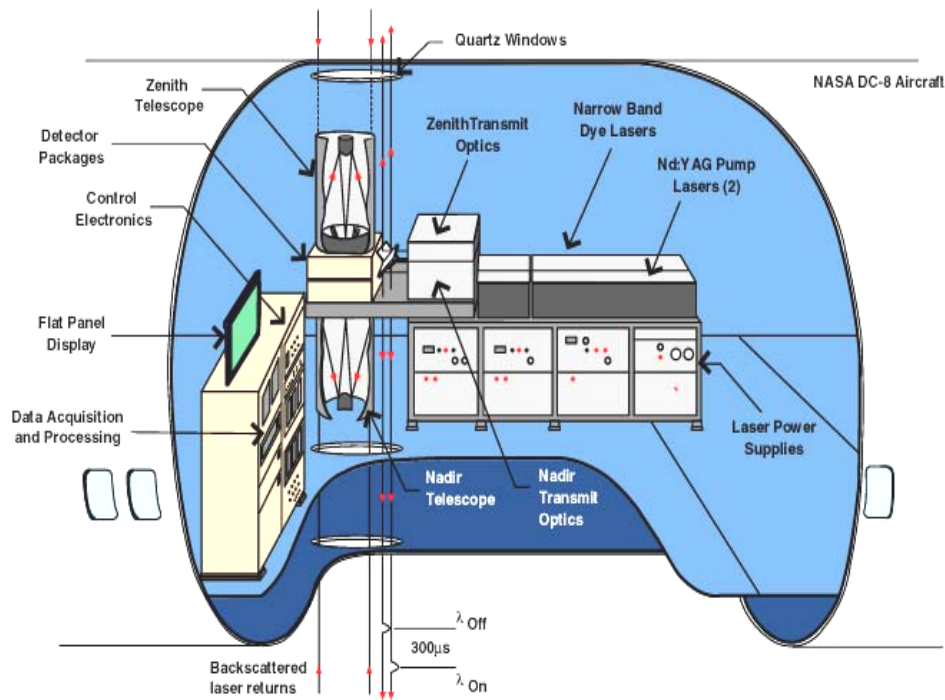


Large-Scale Air Mass Characterization During TRACE-P Based On Remote Ozone and Aerosol Measurements, Meteorological Analyses, and In Situ Measurements

**Ed Browell; UV DIAL Team: Bill Grant, Carolyn Butler,
Marta Fenn, Vince Brackett, John Hair, Lorraine
Brasseur, Tony Notari, Jerry Williams, et al.;**
Meteorological Teams: Henry Fuelberg, Reg Newell, et al.;
PEM Tropics B Science Team: Melody Avery, et al.

**TRACE-P Data Workshop,
Norfolk, VA, 13-16 Nov. 2001**

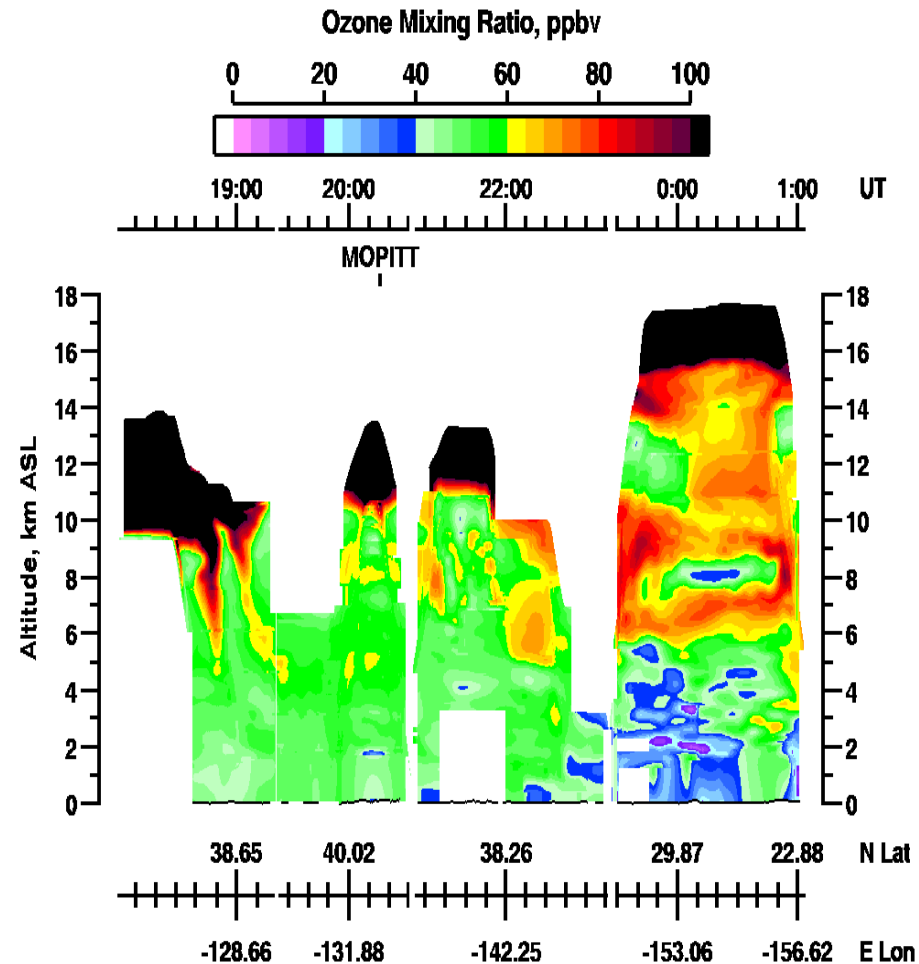
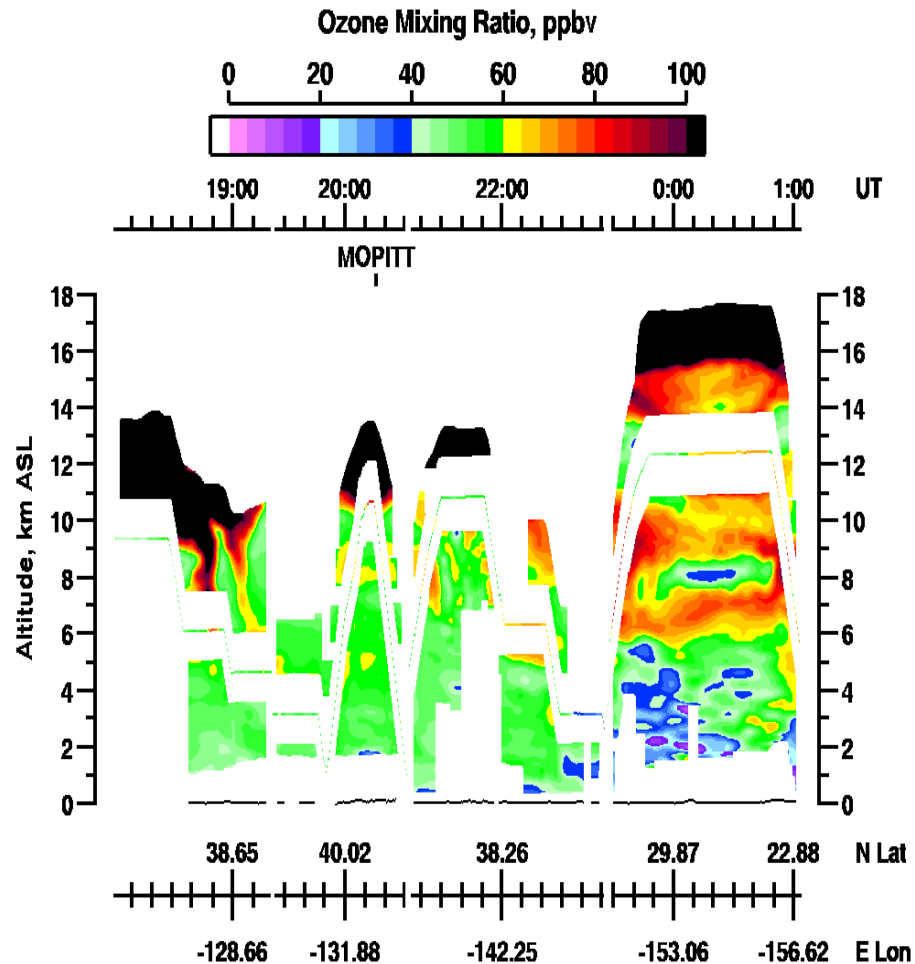
UV DIAL Ozone, Aerosol, & Cloud Measurements



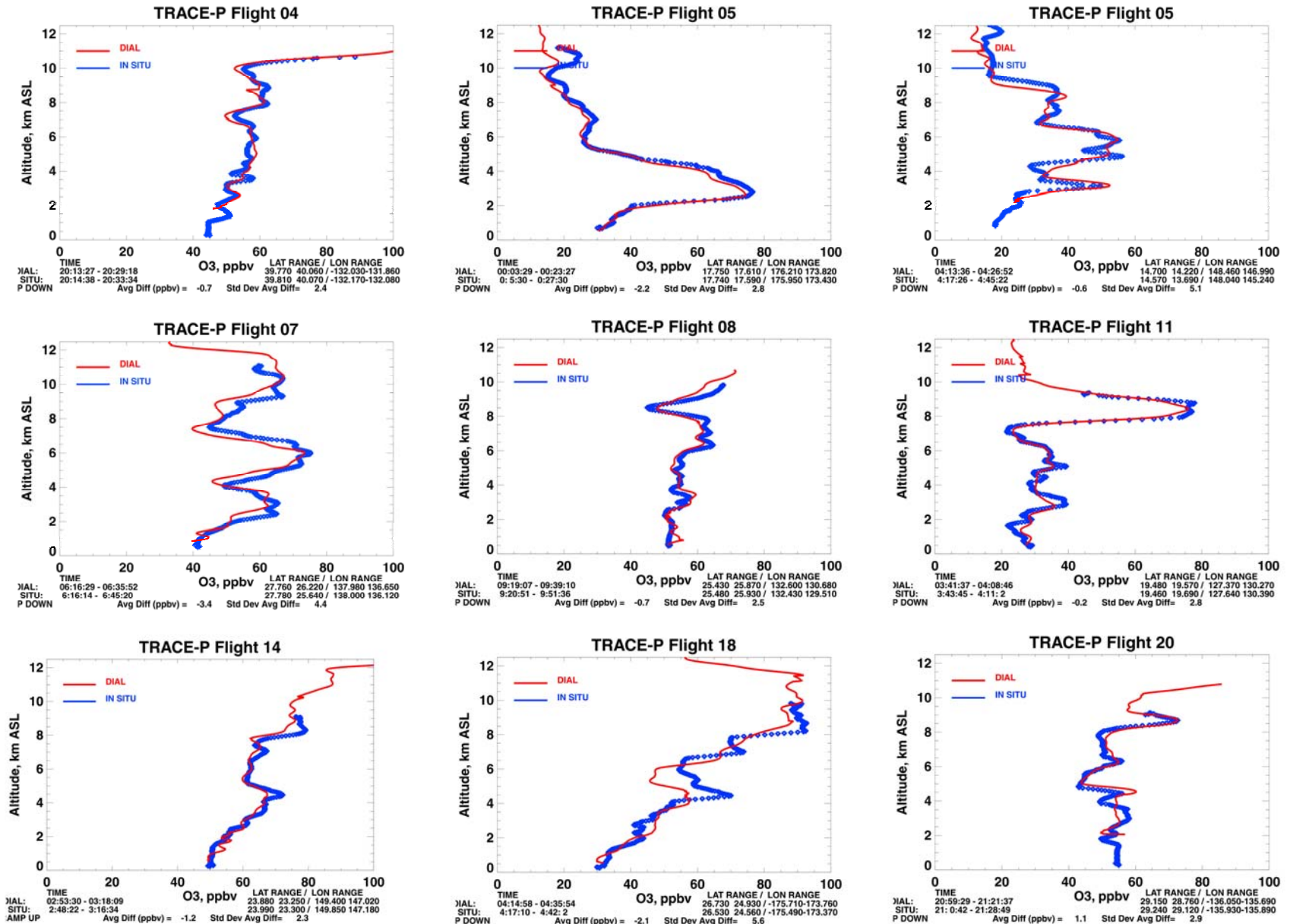
- **Ozone Differential Absorption Lidar (DIAL) Profiles**
($\lambda_{\text{on}}=289 \text{ nm}$ & $\lambda_{\text{off}}=300 \text{ nm}$)
- **Aerosol & Cloud Scattering Ratio Profiles (600 & 1064 nm)**
- **Simultaneous Nadir and Zenith Ozone & Aerosol Profiling**
- **Nadir Aerosol Depolarization Profiles (600 nm)**

Ozone Measurements and Cross Section Determination

Flight 4 Dryden to Kona 25 Feb. 2001

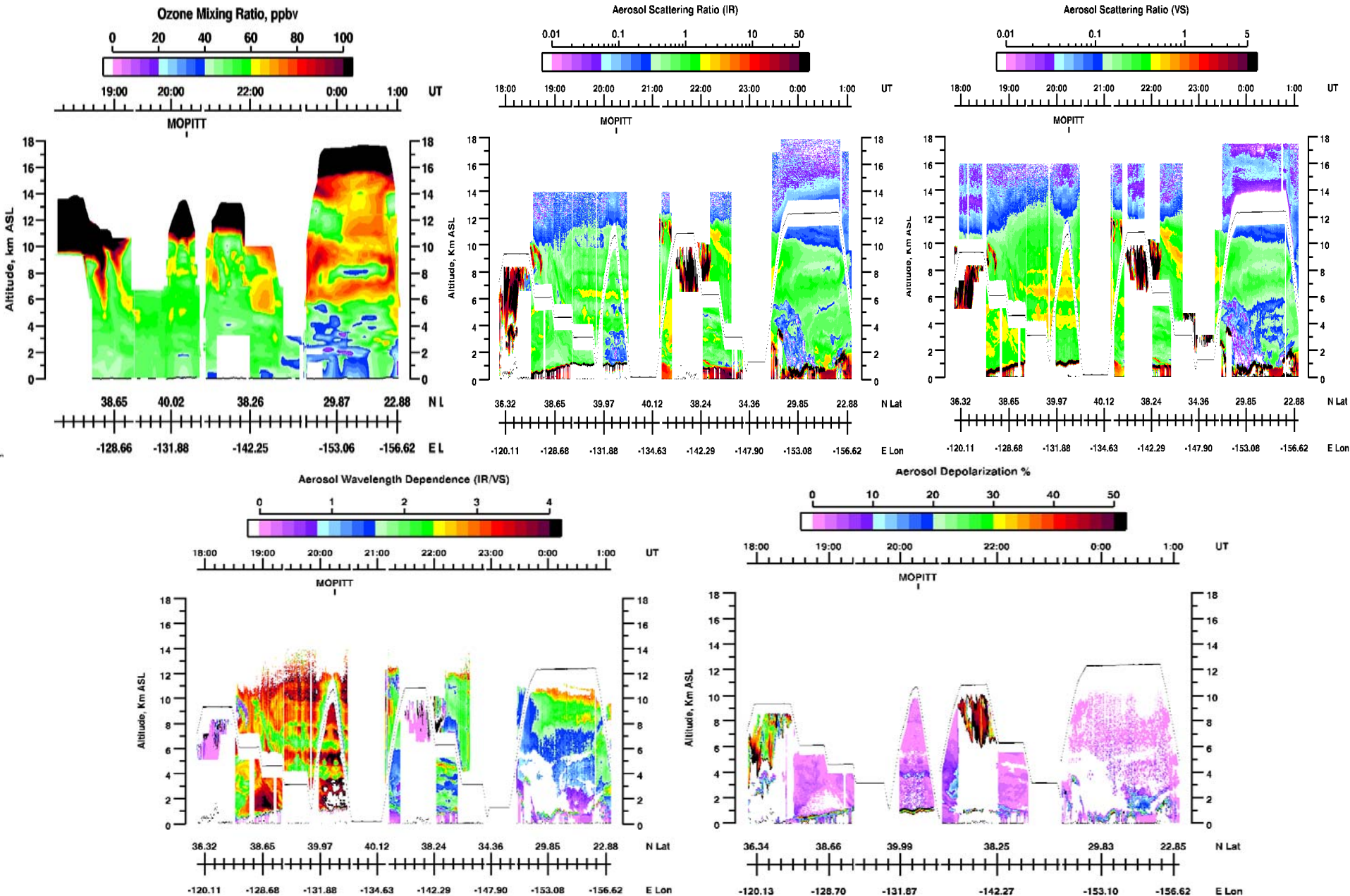


Comparisons of UV DIAL and In Situ Ozone Measurements



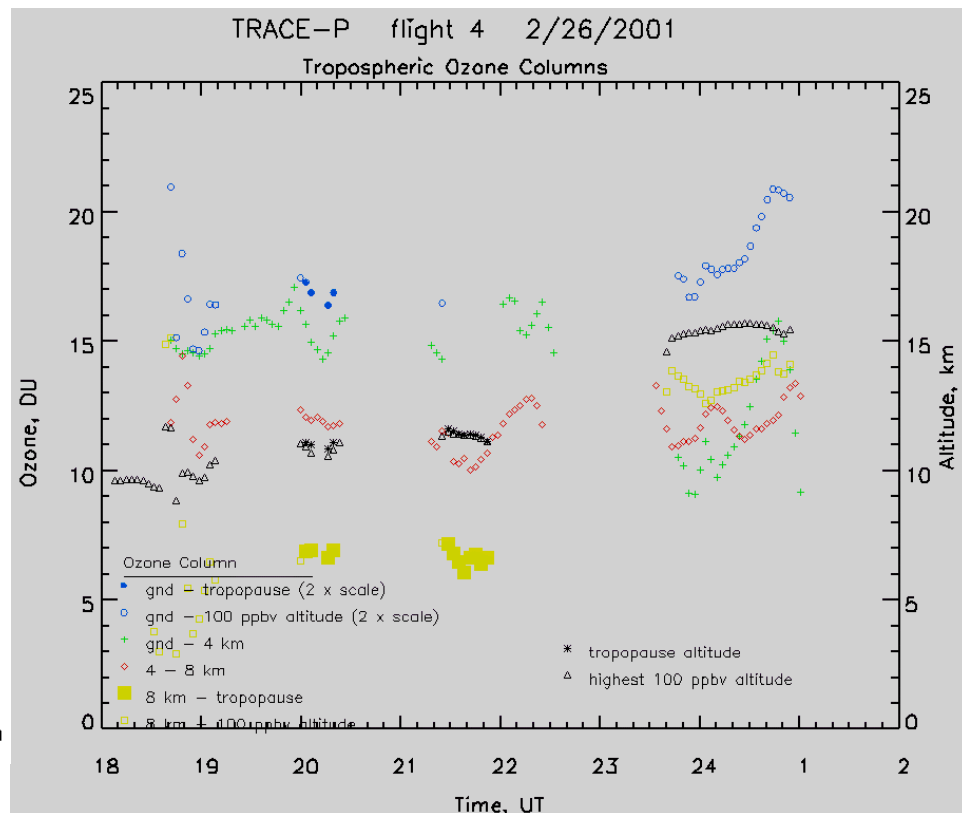
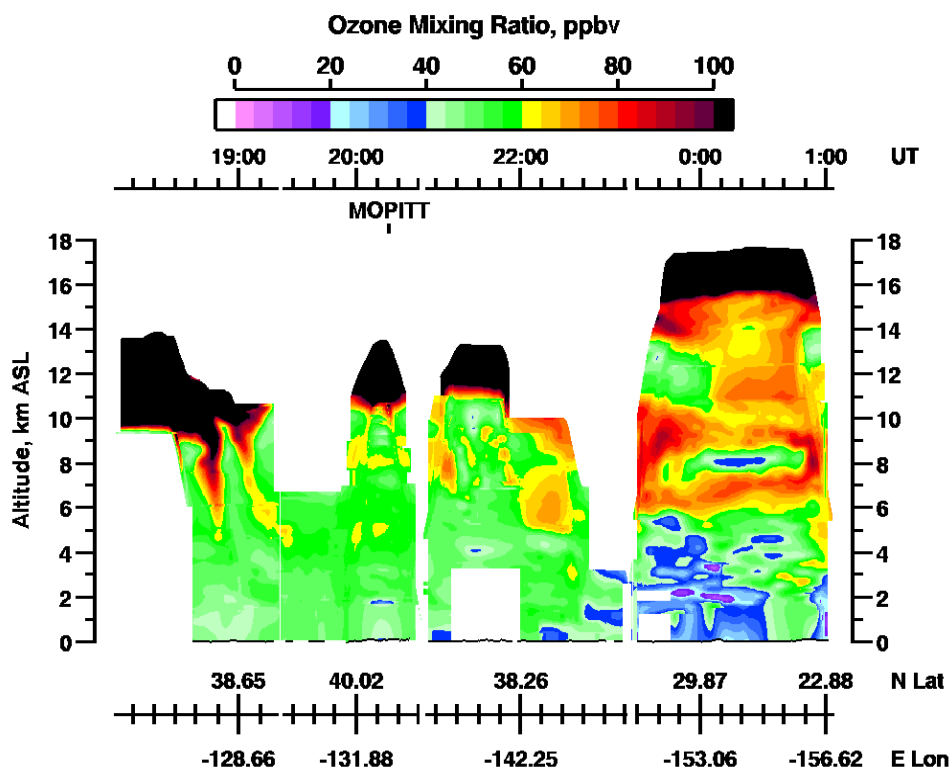
TRACE-P Flt. 4 Dryden to Kona 26 Feb. 2001

Ozone & Aerosols: Scattering Ratios; Wavelength Dependence; & Depolarization

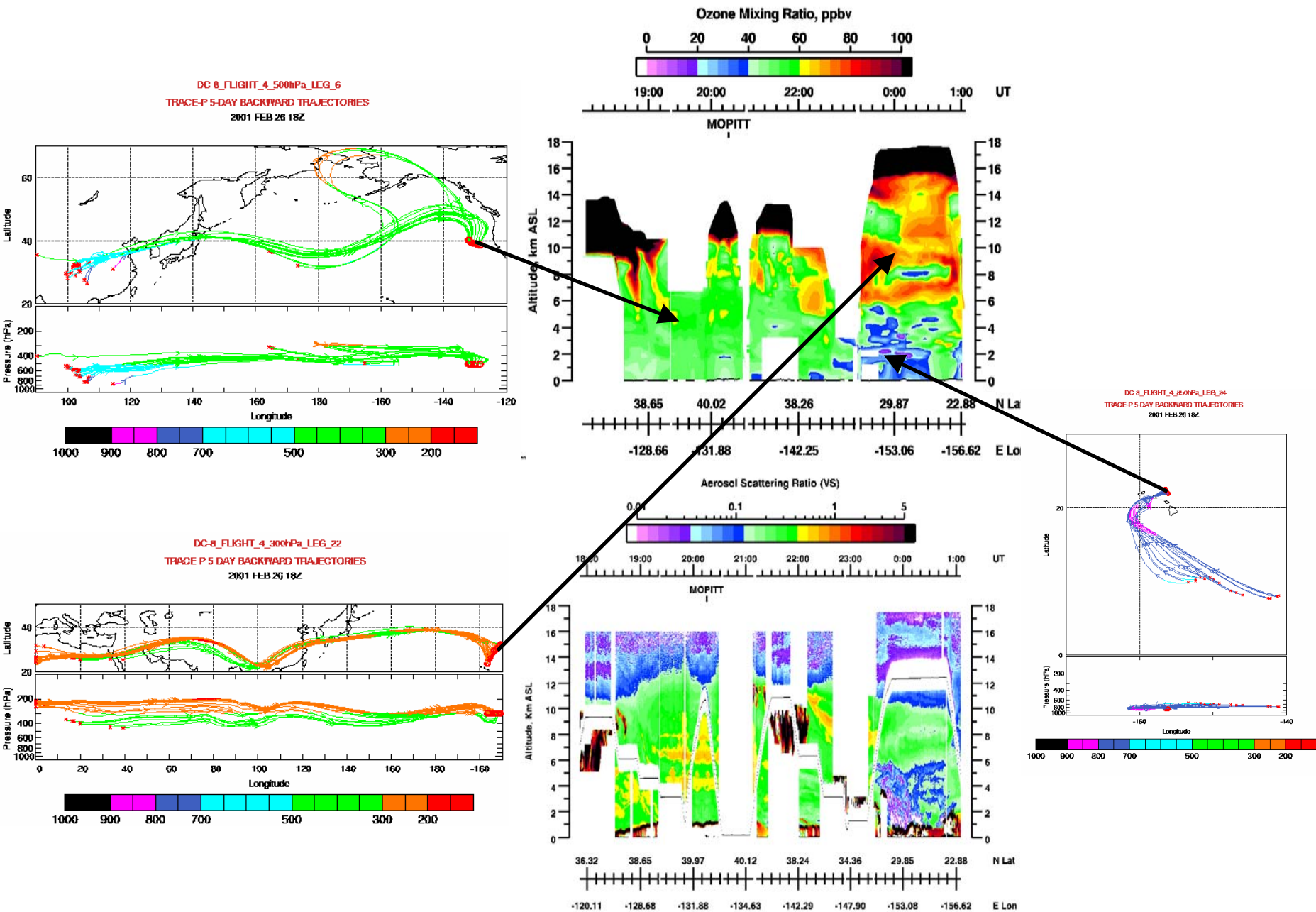


TRACE-P Flt. 4 Dryden to Kona 26 Feb. 2001

Tropopause Heights and Ozone Columns

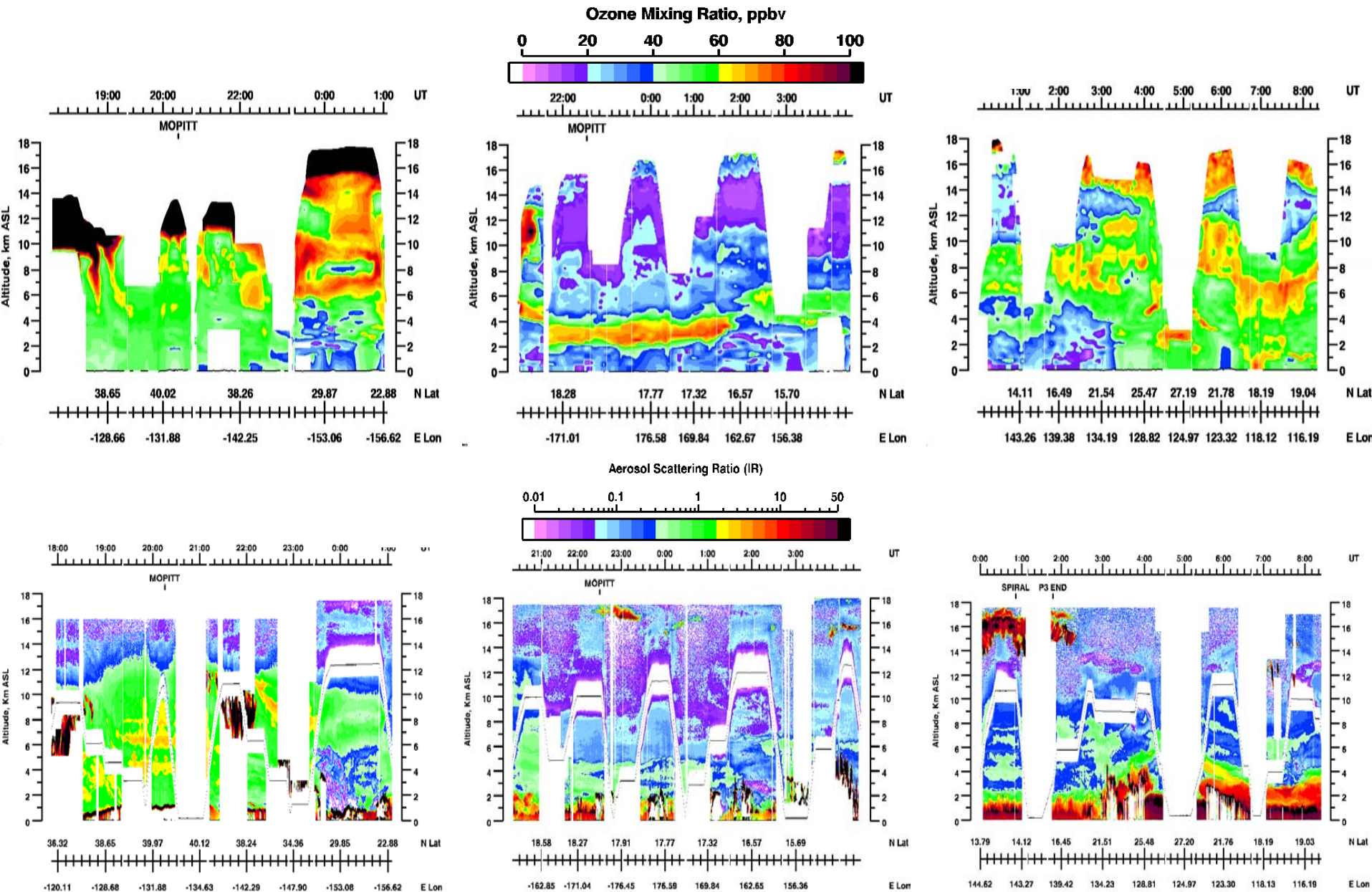


TRACE-P Flt. 4 Dryden to Kona 26 Feb. 2001



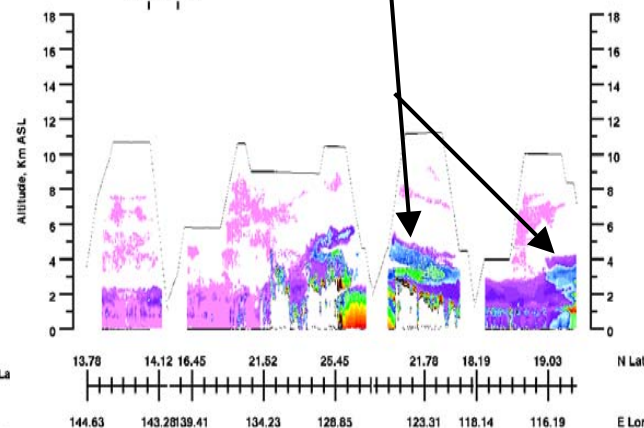
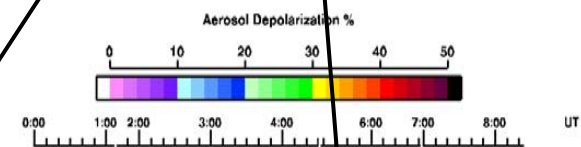
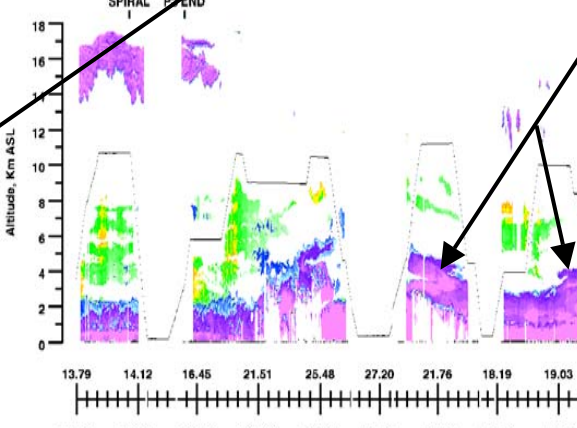
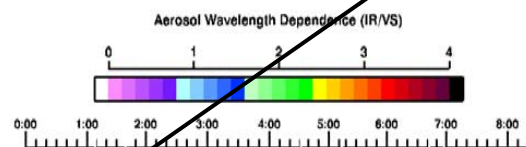
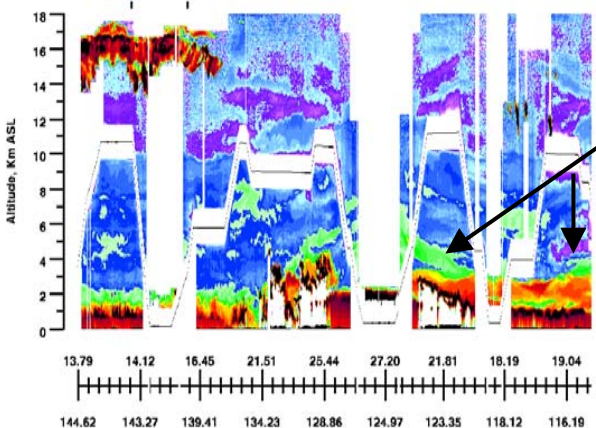
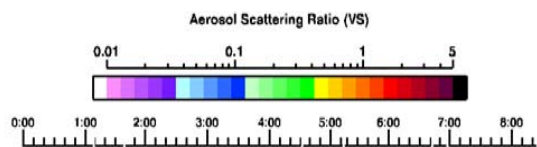
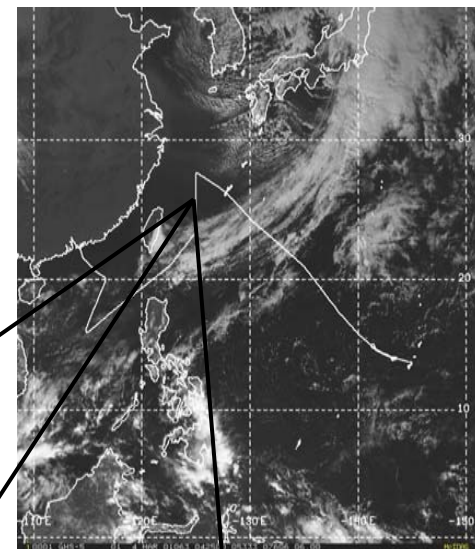
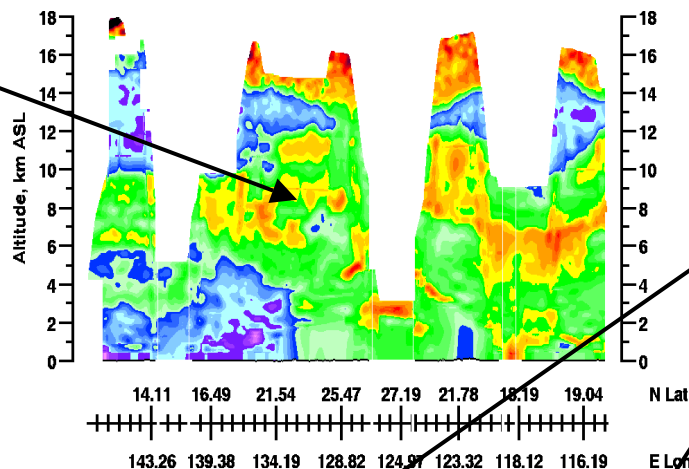
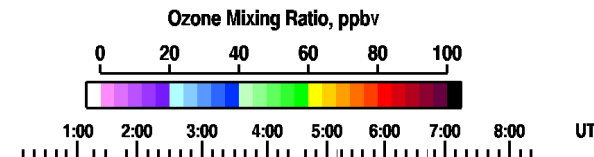
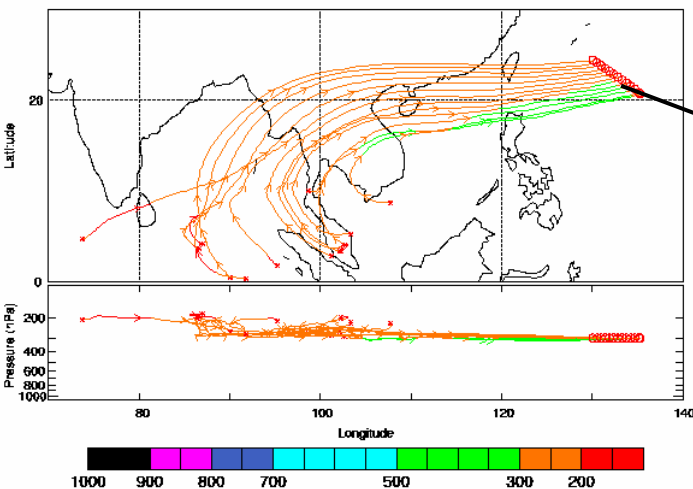
Ozone and Aerosol Distributions from Dryden to Hong Kong

Flts 4-6 (26 Feb. - 4 Mar. 2001)

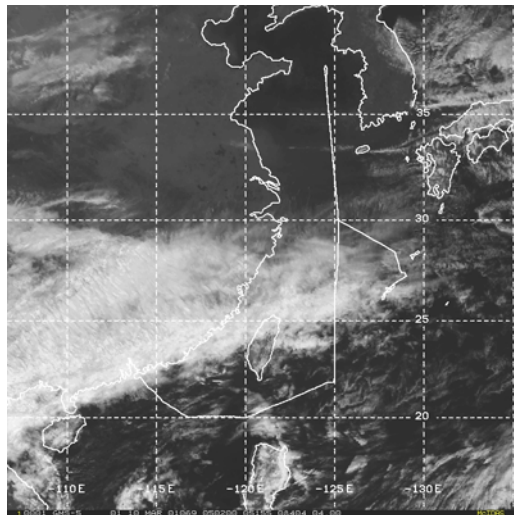


TRACE-P Flt. 6 Guam to Hong Kong 4 March 2001

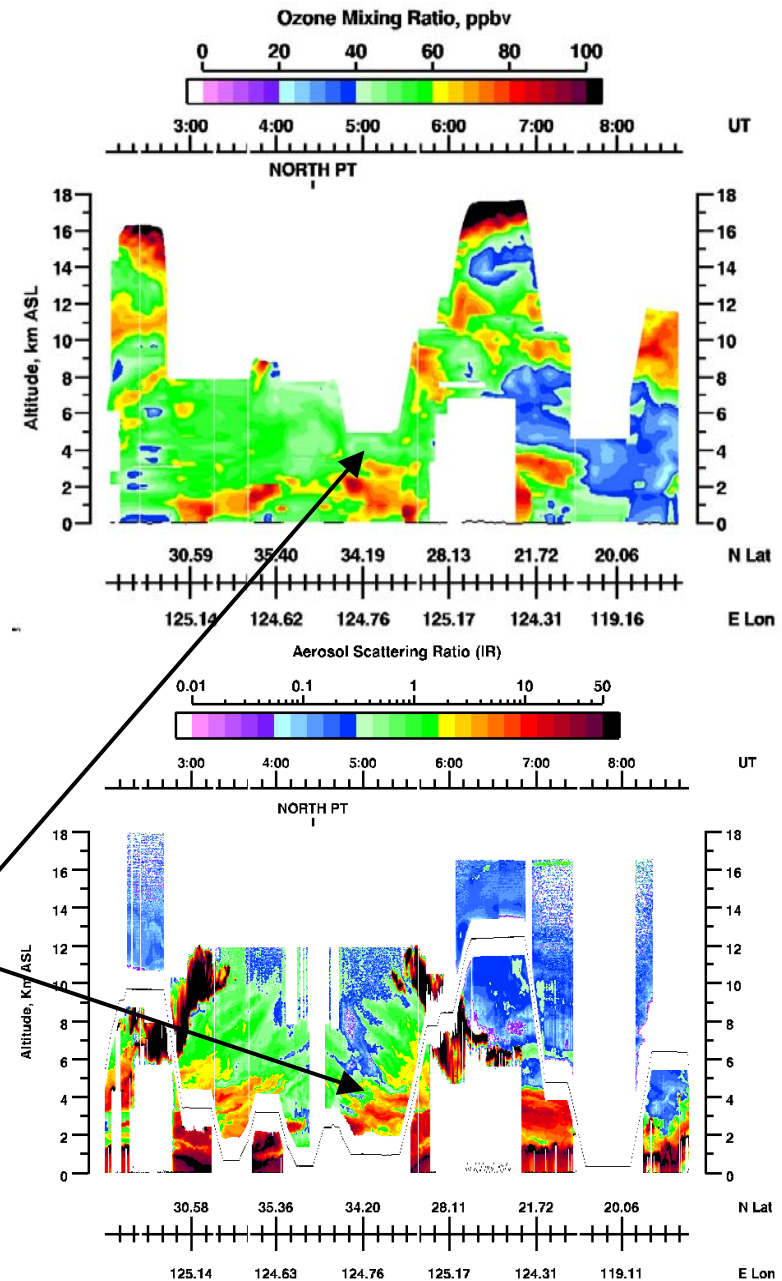
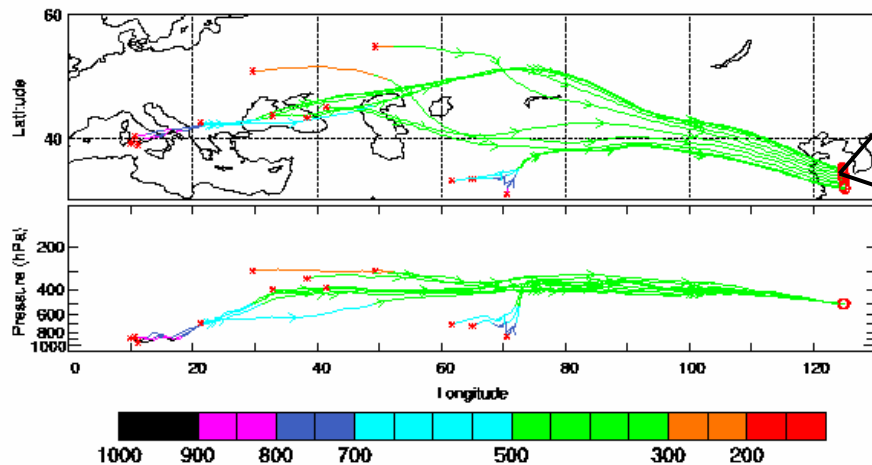
DC-8 FLIGHT 6 300hPa LEG 11
TRACE-P 5-DAY BACKWARD TRAJECTORIES
2001 MAR 04 06Z



TRACE-P Flt. 9 China Outflow 10 March 2001

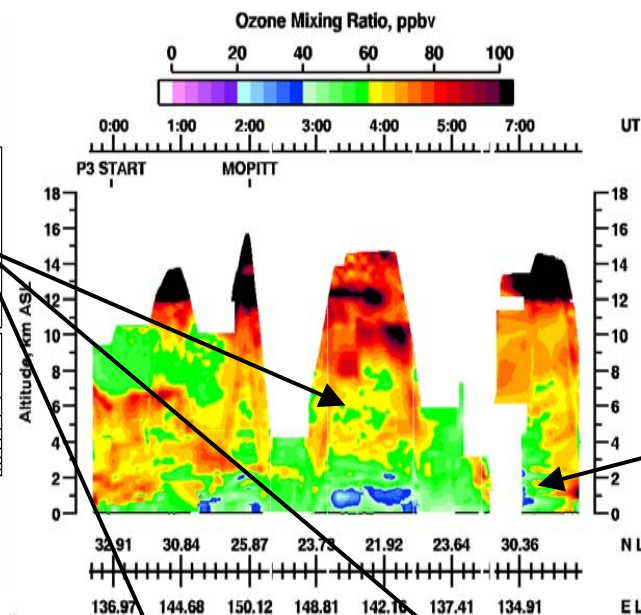
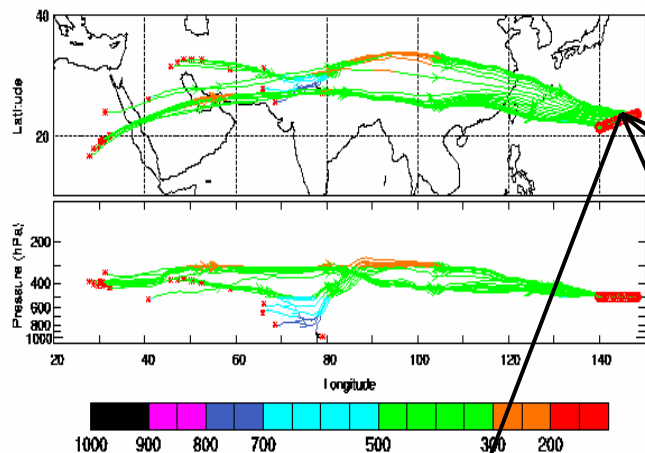


DC-8 FLIGHT 9 500hPa I FG 11
TRACE-P 5-DAY BACKWARD TRAJECTORIES
2001 MAR 10 06Z

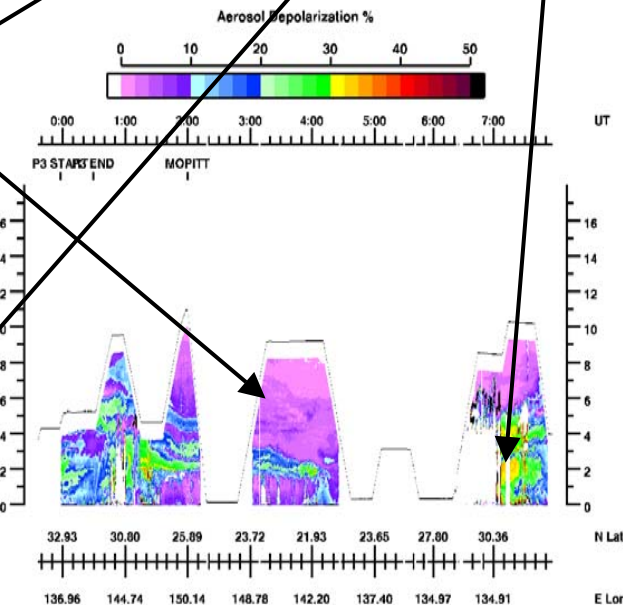
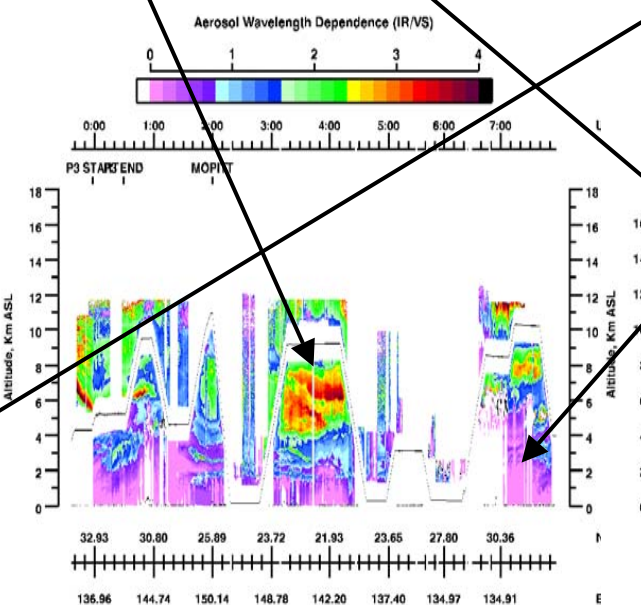
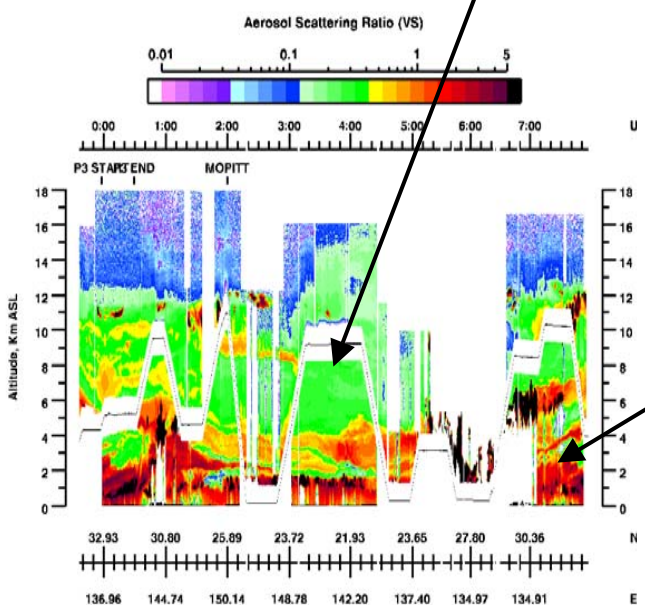
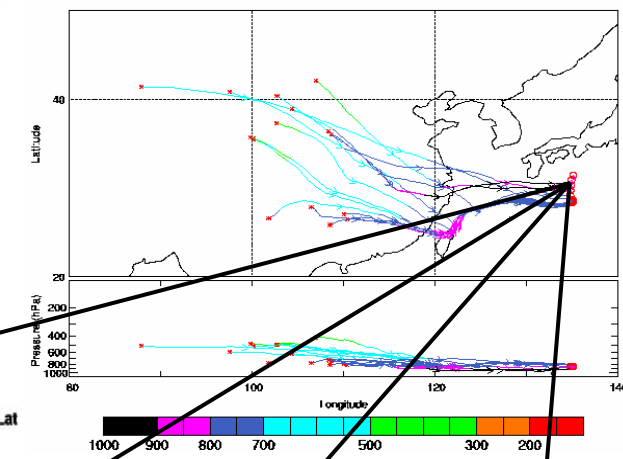


TRACE-P Flt. 14 Convective Outflow 23 March 2001

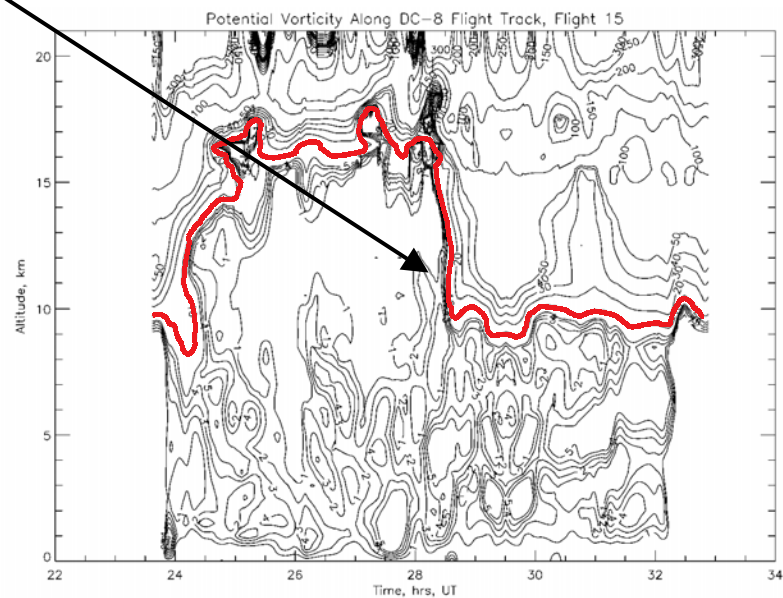
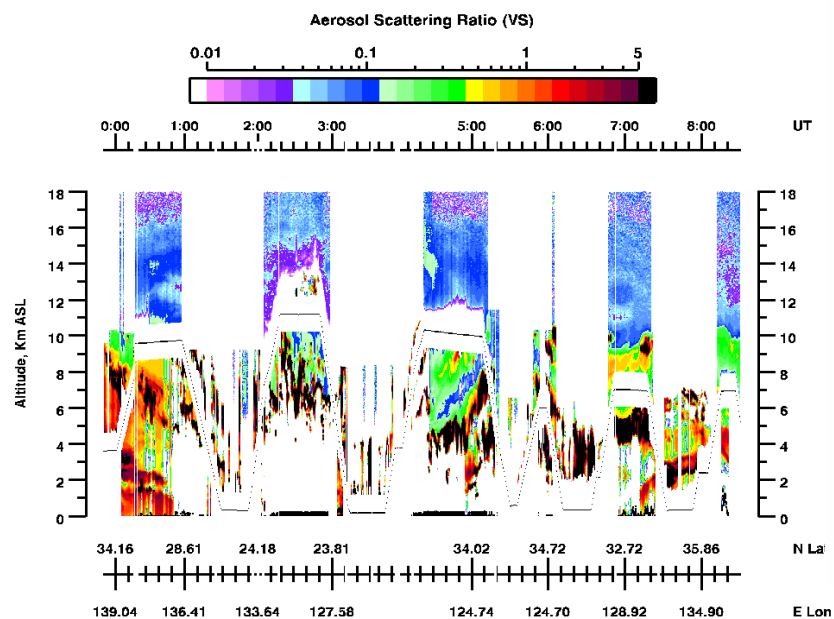
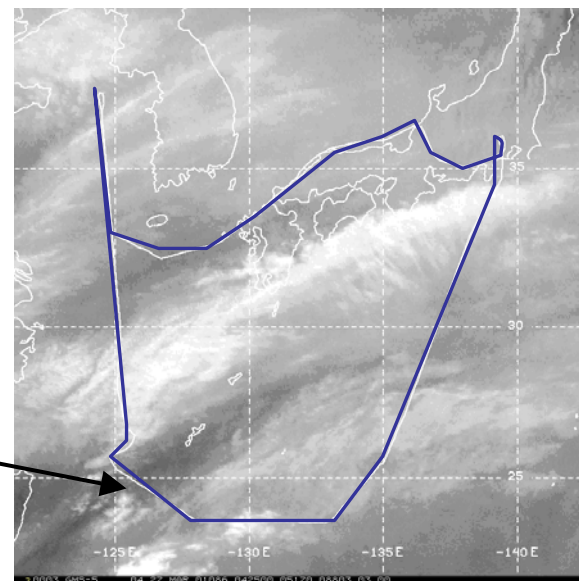
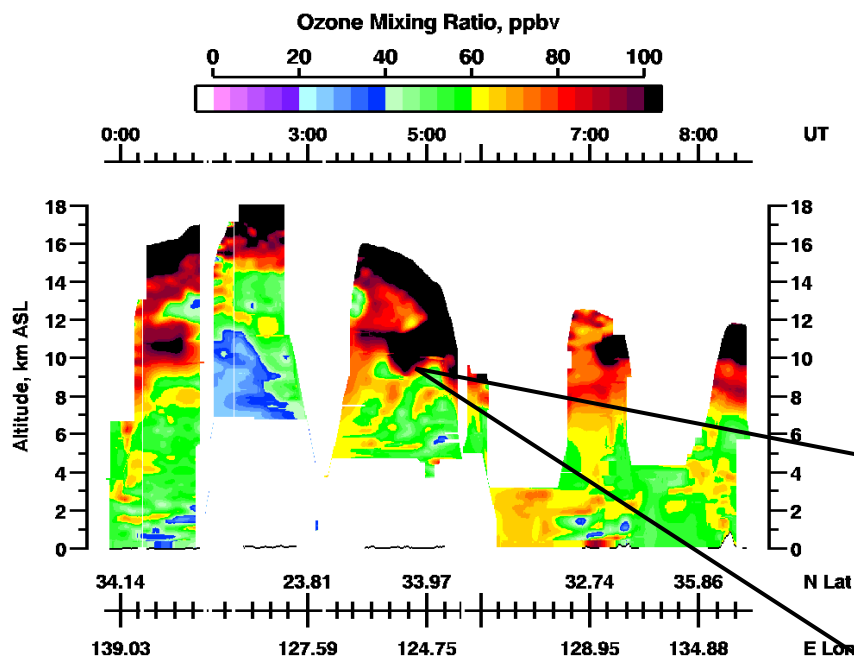
DC-8 FLIGHT 14 500hPa I FG 13
TRACE-P 5-DAY BACKWARD TRAJECTORIES
2001 MAR 24 06Z



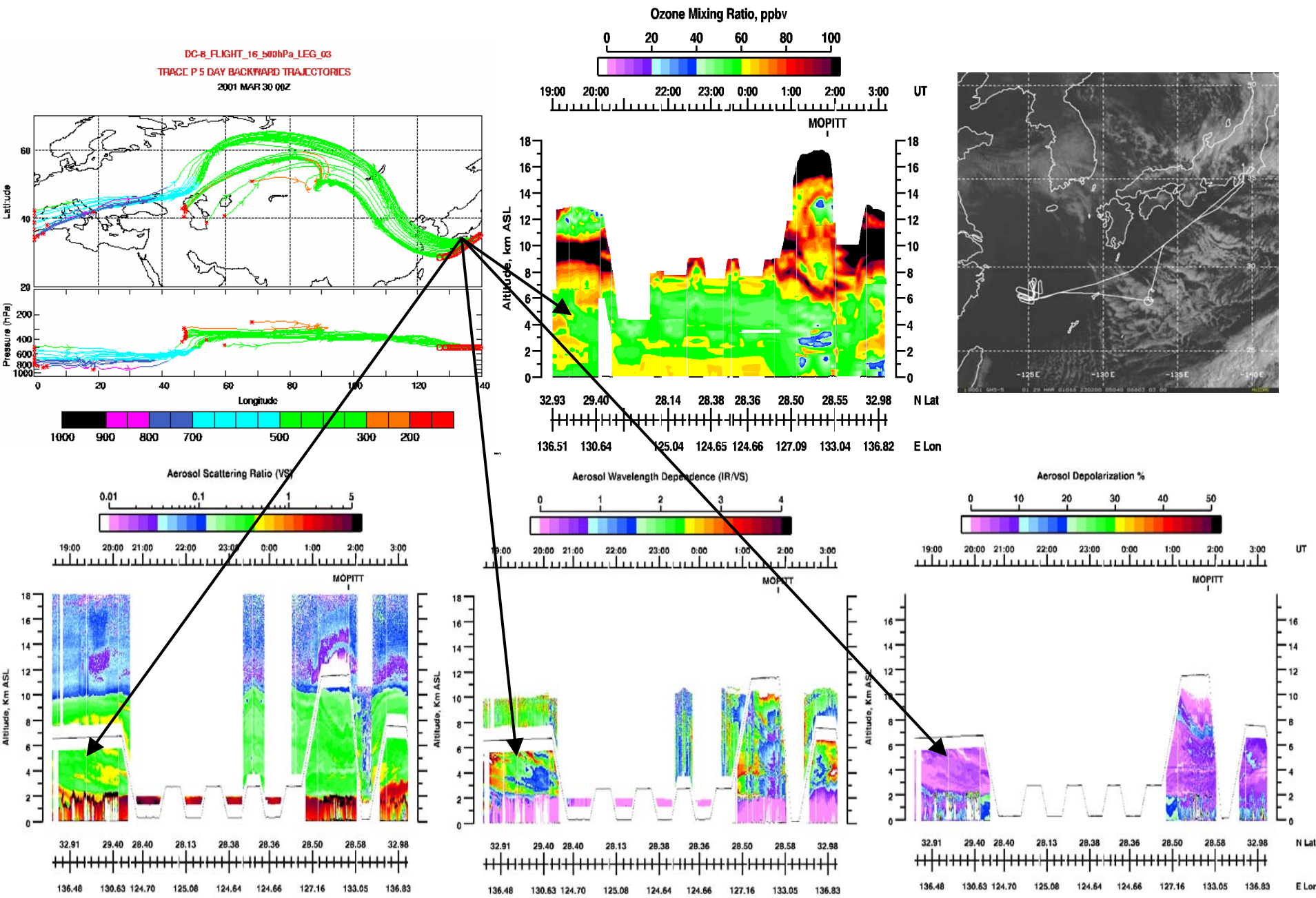
DC-8 FLIGHT 14 850hPa I FG 19
TRACE-P 5-DAY BACKWARD TRAJECTORIES
2001 MAR 24 06Z



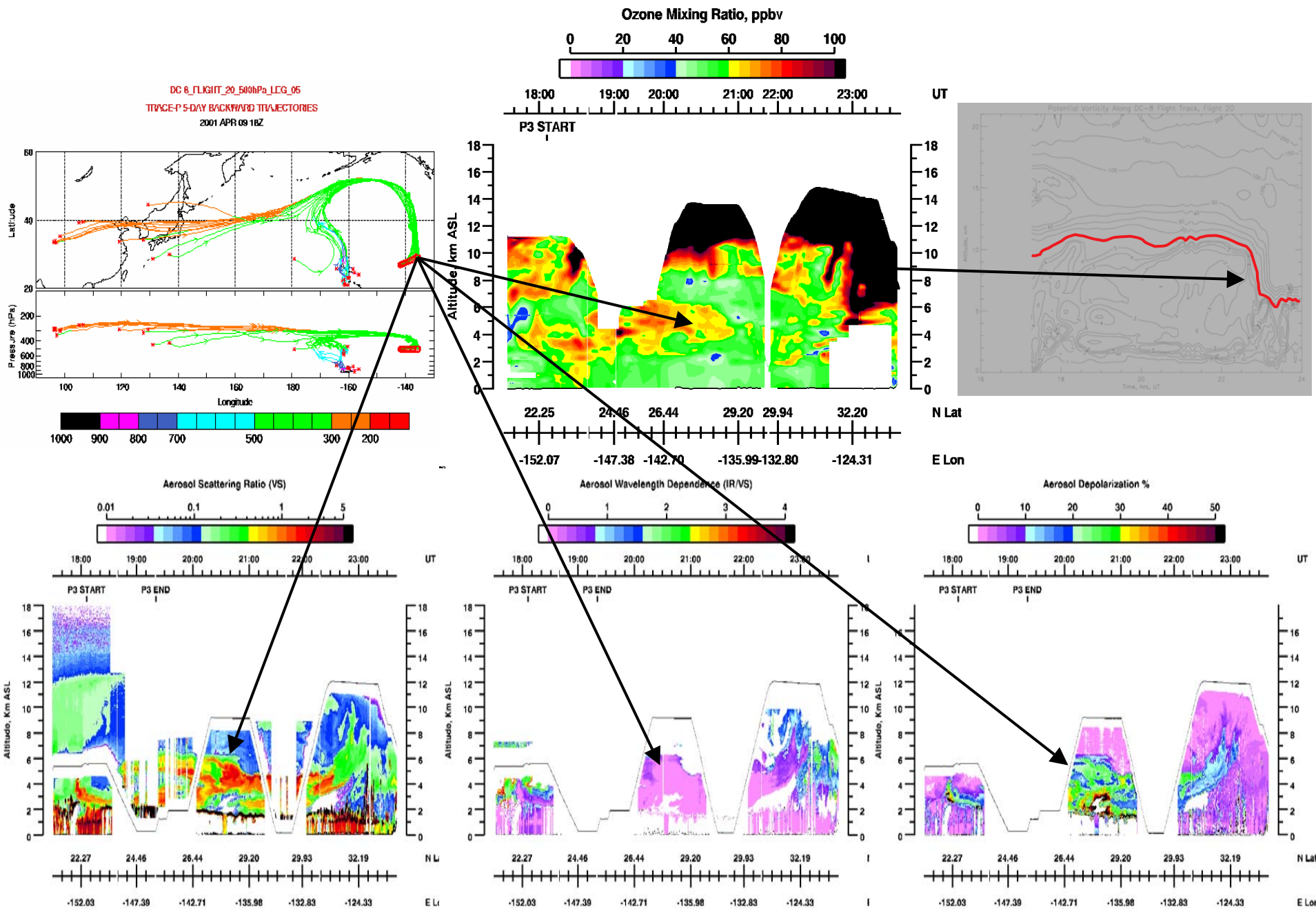
TRACE-P Flt. 15 Convective Outflow 26 March 2001



TRACE-P Flt. 16 Sunrise Photochemistry 29 March 2001



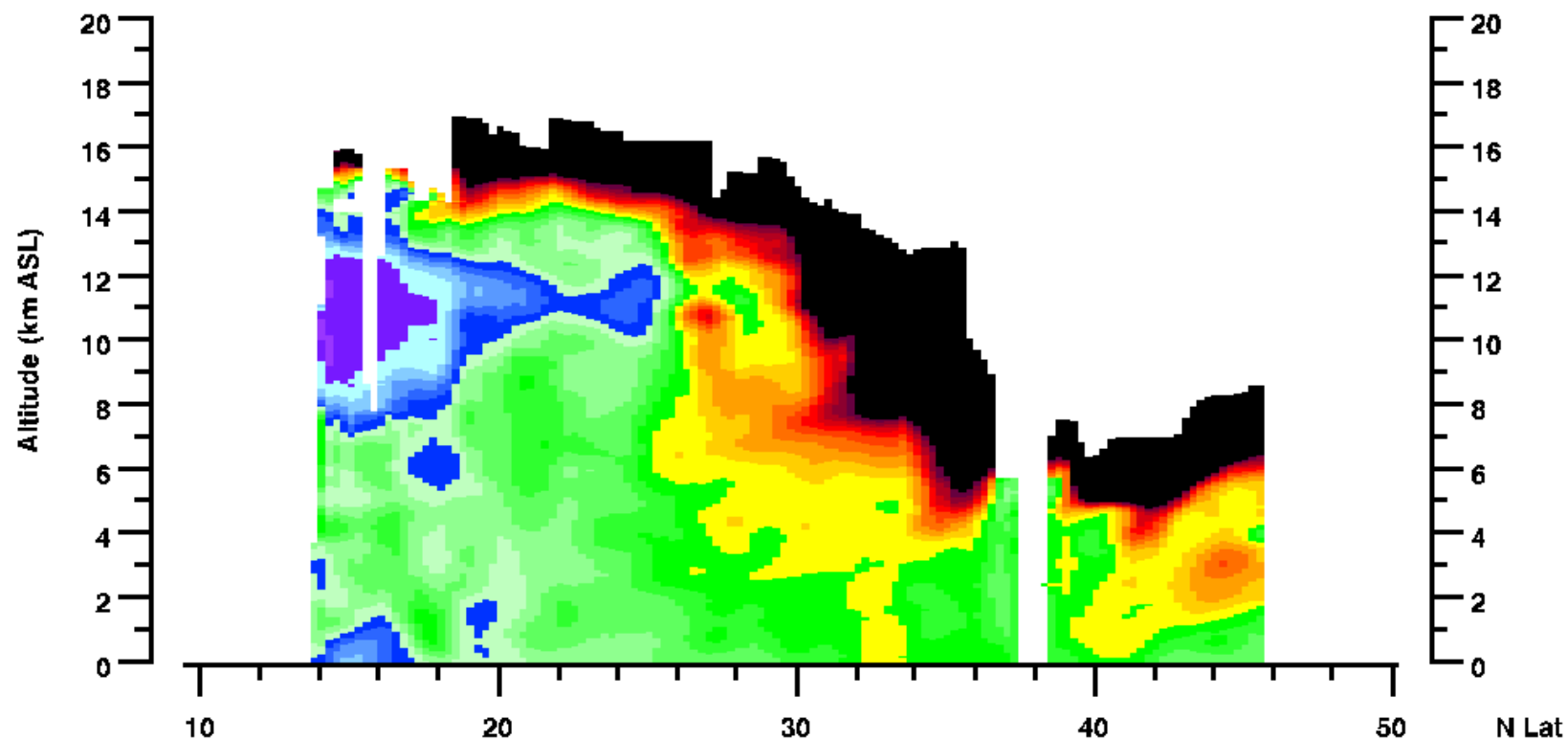
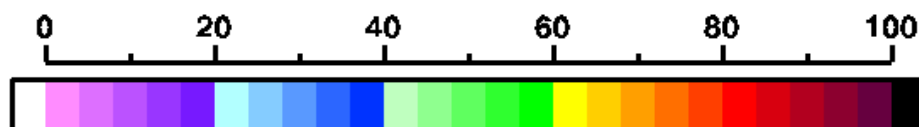
TRACE-P Flt. 20 Kona to Dryden 9 April 2001



TRACE-P
Latitudinal Ozone Distribution

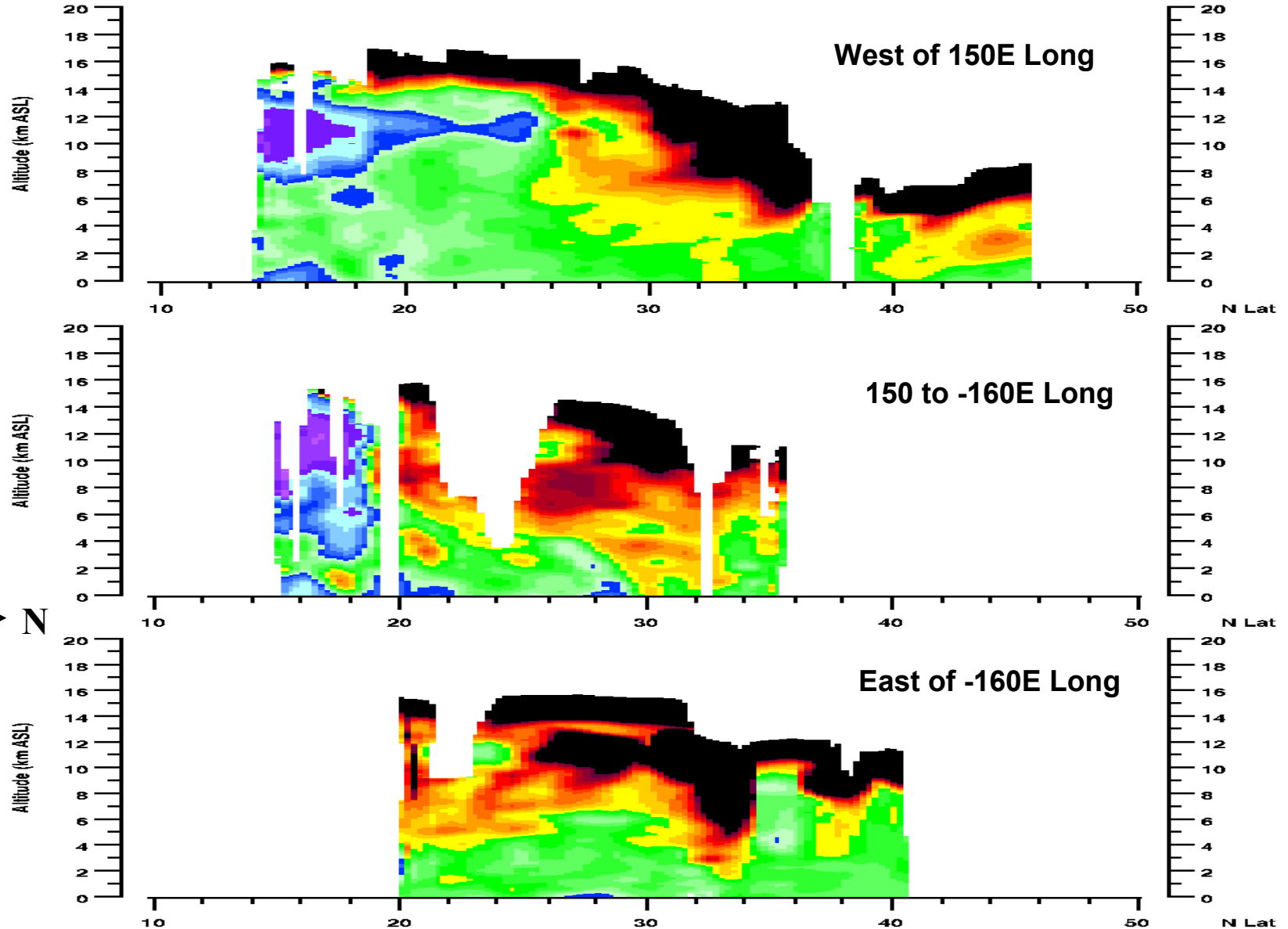
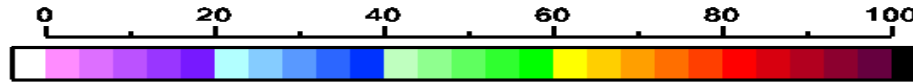
(West of 150 E Long)

Average Ozone (ppbv)



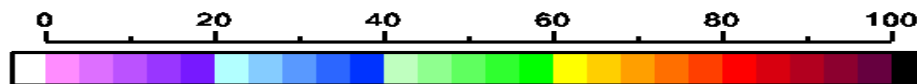
Average Latitudinal Ozone Distributions

Average Ozone (ppbv)

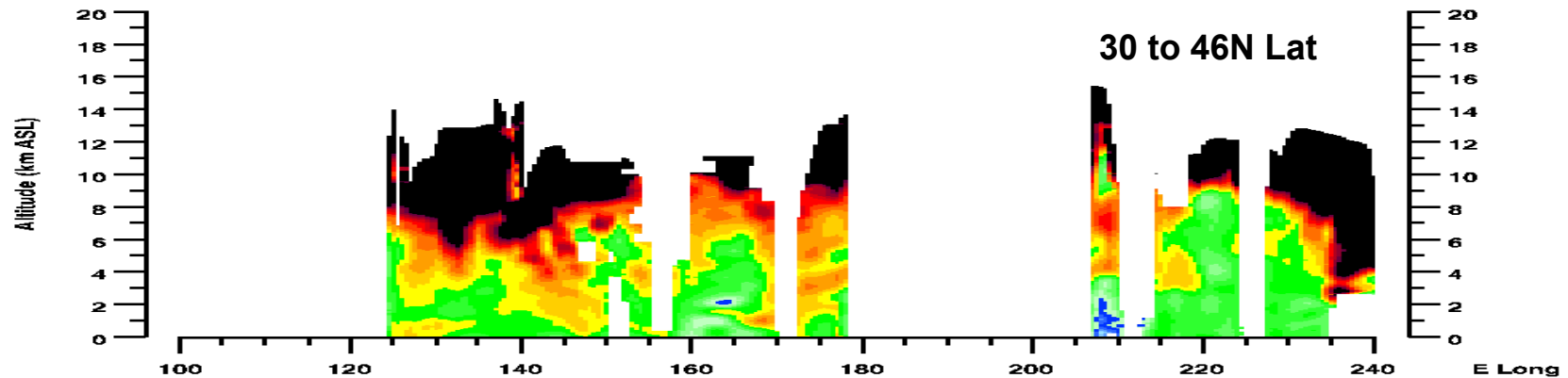


Average Longitudinal Ozone Distributions

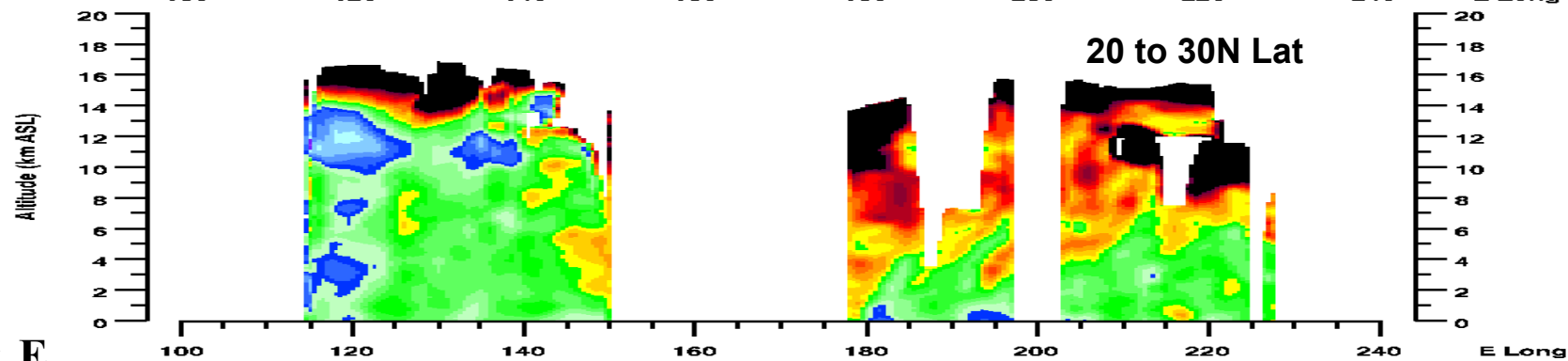
Average Ozone (ppbv)



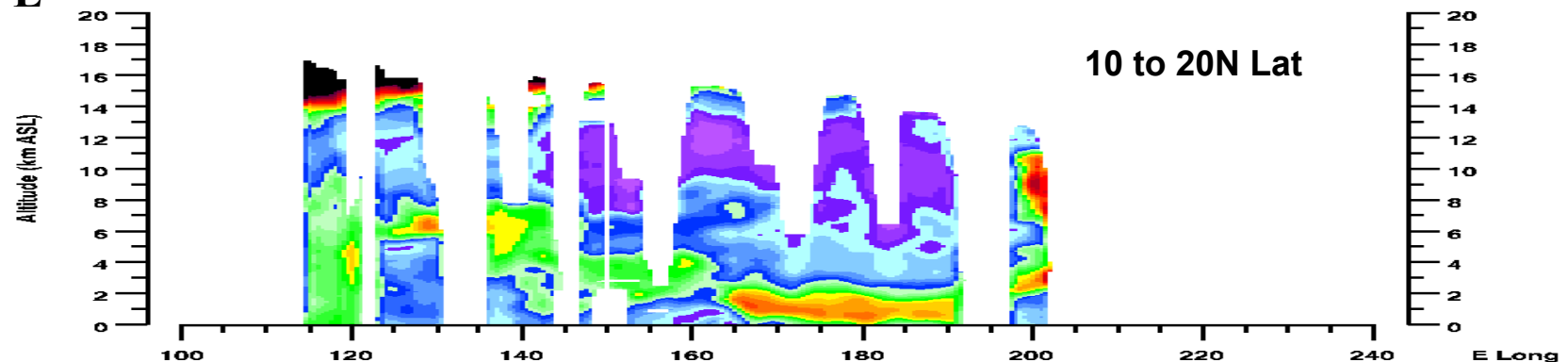
30 to 46N Lat



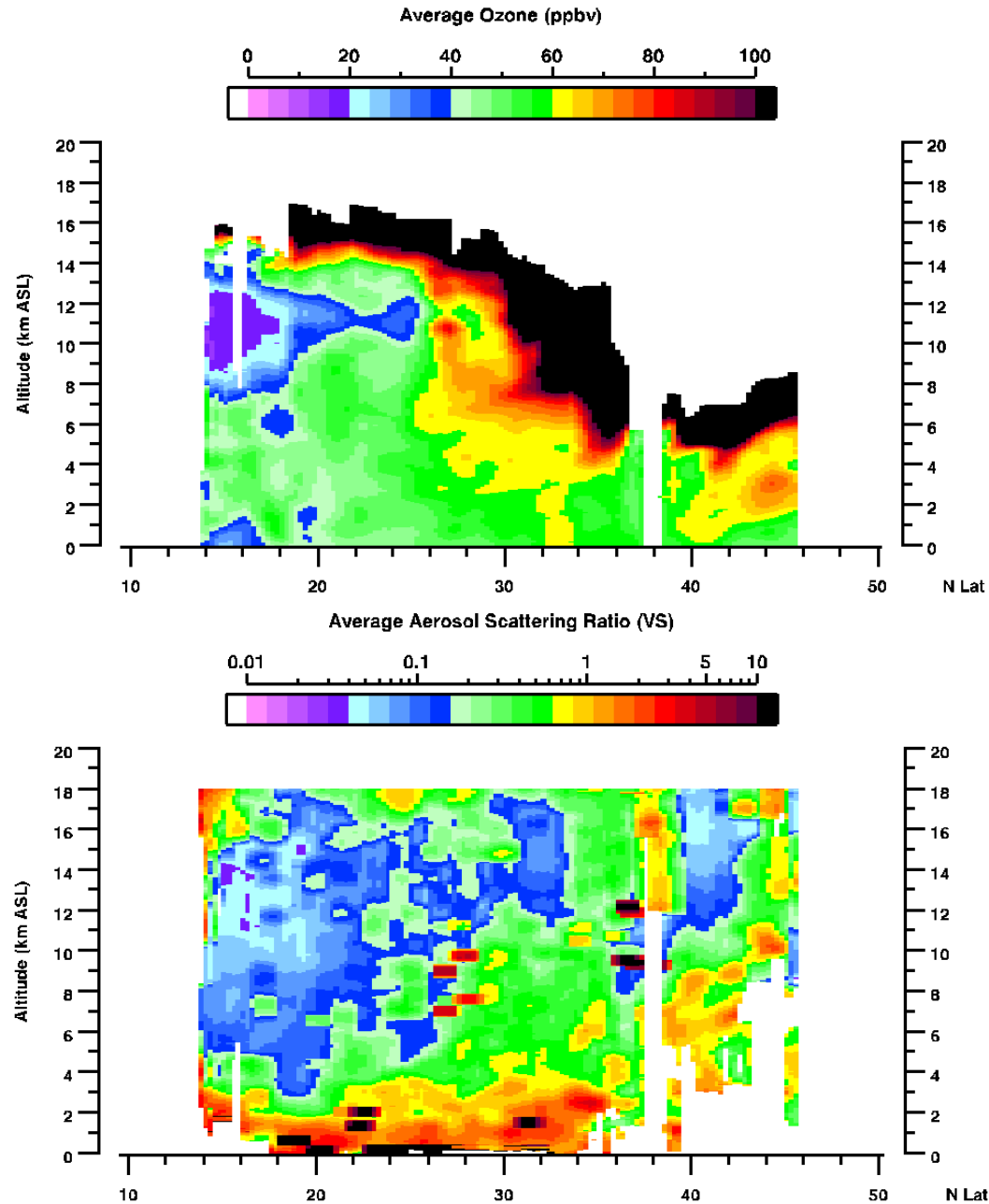
20 to 30N Lat



10 to 20N Lat



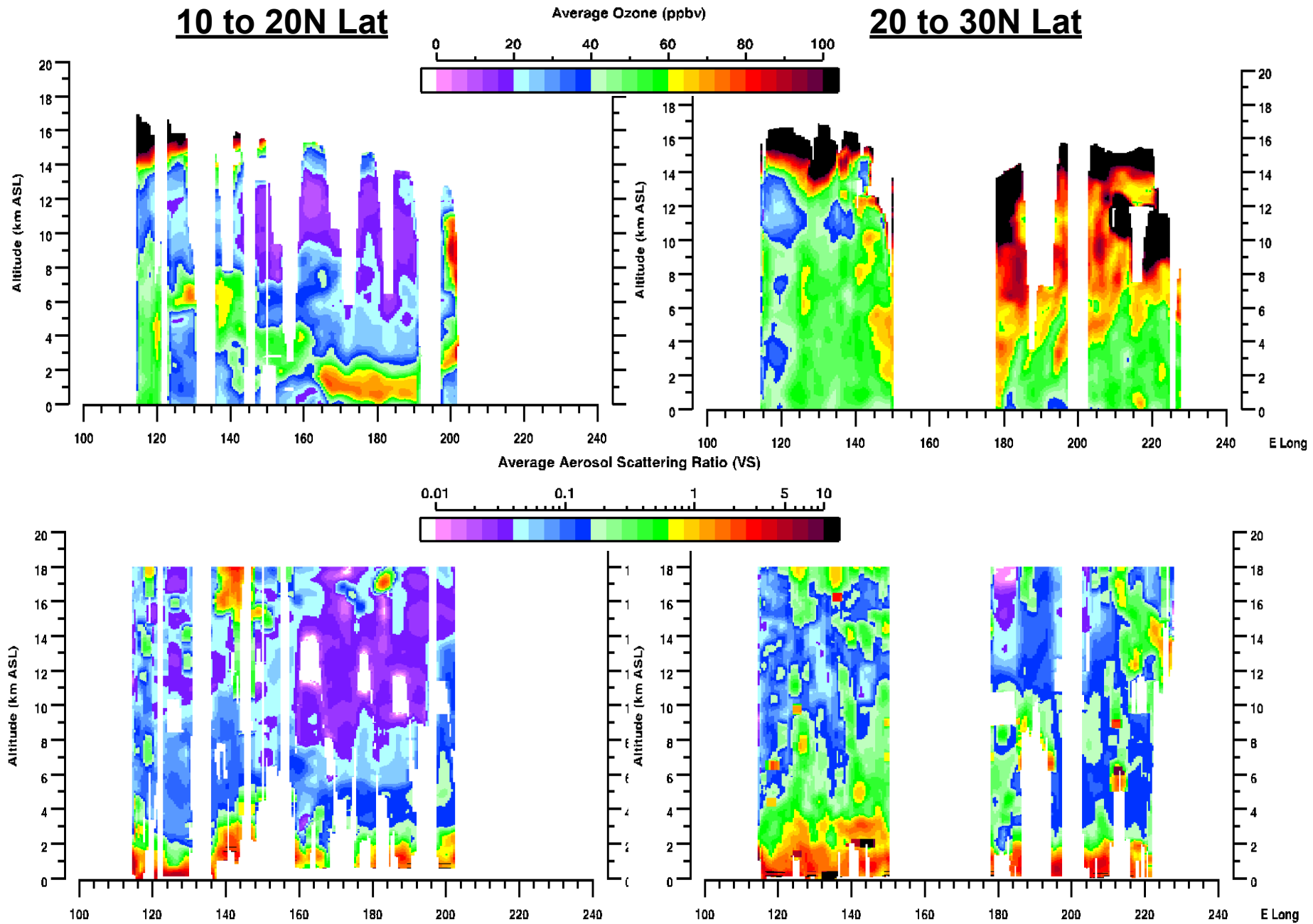
Average Latitudinal Ozone & Aerosol Distributions (West of 150E)



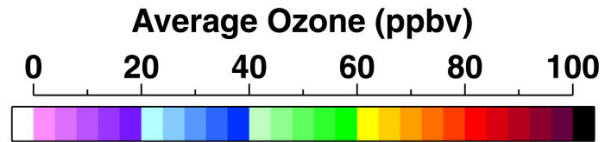
Average Longitudinal Ozone & Aerosol Distributions

10 to 20N Lat

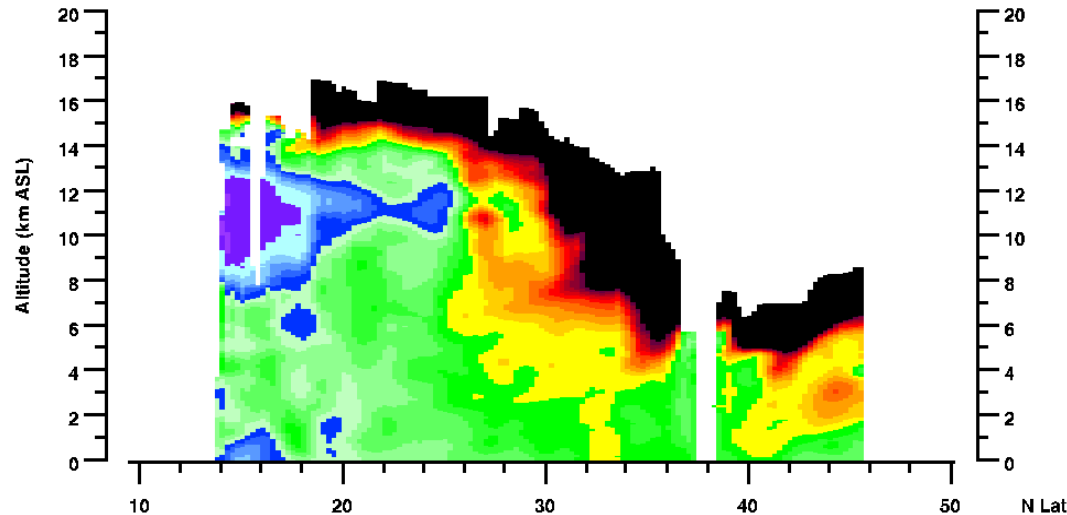
20 to 30N Lat



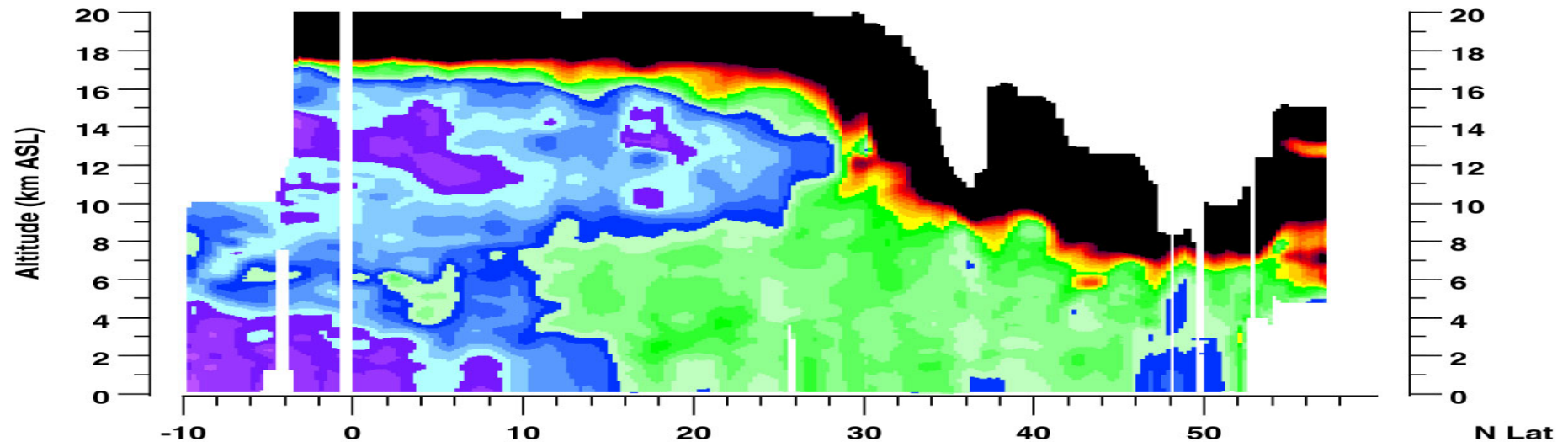
Comparison of TRACE-P & PEM West B Average Latitudinal Ozone Distributions



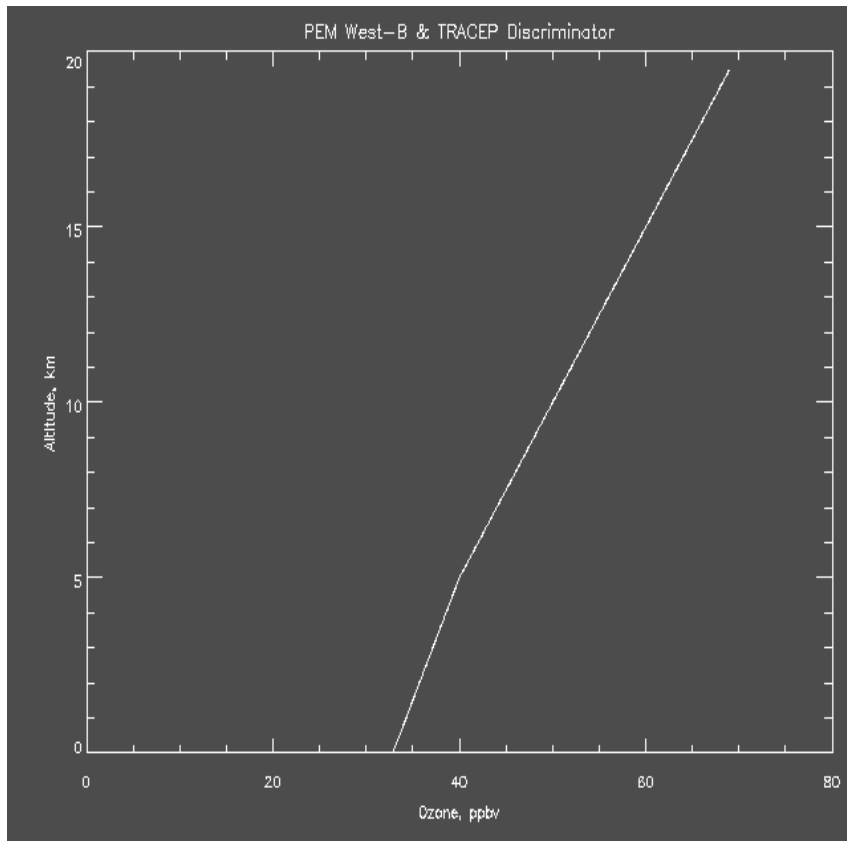
TRACE-P



PEM West B



Air Mass Types



Reference (REF): Ozone values within 20% of reference profile (RP) and low IR aerosol scattering ratios ($S < 0.2$).

Near Surface (NS): Air with high aerosol loading associated with boundary layer.

Convective Outflow (CO): Ozone more than 20% below RP with cirrus clouds in the vicinity.

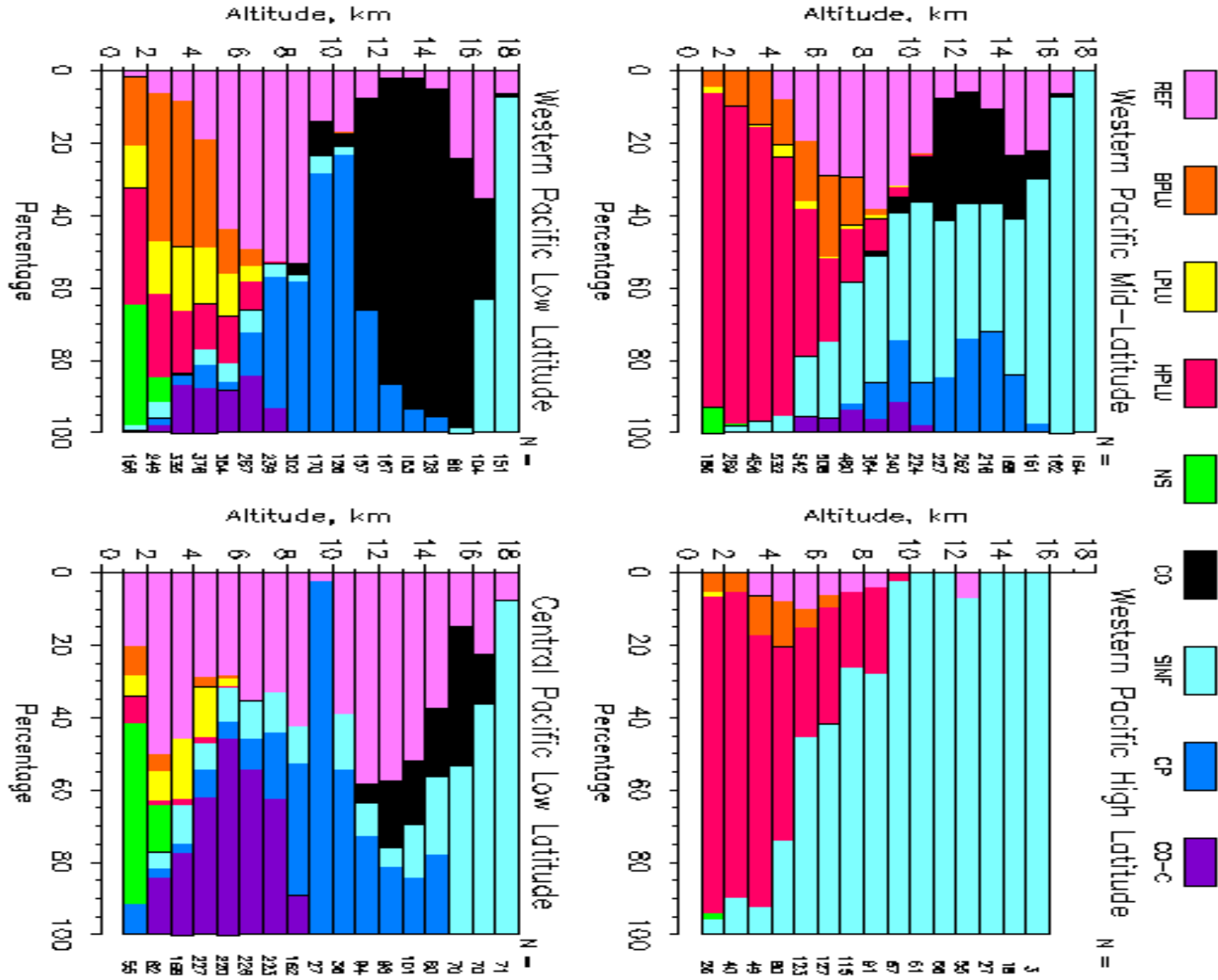
High Ozone Plume (HPLU): Ozone more than 20% above RP and $S > 0.2$.

High Ozone (HO3): Ozone more than 20% above RP, $S < 0.2$, and amount of O_3 attributable to stratosphere is $< 25\%$.

High Ozone Mixture (HO3M): Same as HO3 except the amount of O_3 attributable to stratosphere is 25-60%.

Stratospherically Influenced (SINF): Same as HO3 except that the amount of O_3 attributable to stratosphere is $> 60\%$.

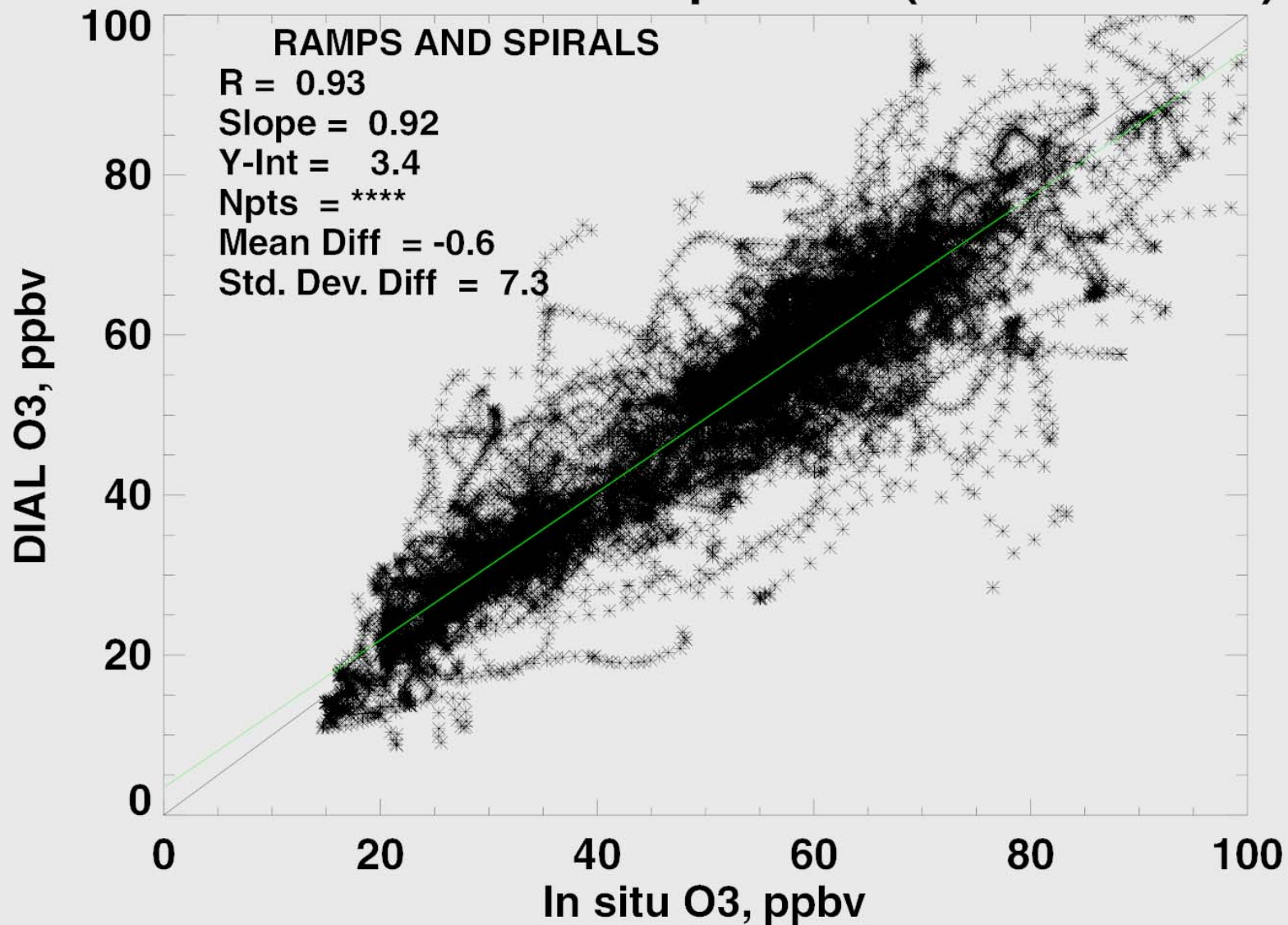
Air Mass Types Observed During PEM West-B



Planned Activities

- Complete air mass categorization, examine fraction of time each type was observed and the fraction of O₃ represented by each air mass, and compare with PWB.
- Determine the average air mass characteristics from in situ and remote measurements for the various air mass types and compare to results from PWB.
- Examine correlations between O₃ , aerosol scattering ratios, aerosol wavelength dependences, aerosol depolarization with respect to different air mass types.
- Complete the reprocessing of PWB relative aerosol data into aerosol scattering ratio form for comparison with TRACE-P aerosol results.
- Compare O₃ and aerosol results with model predictions.
- Collaborate with TRACE-P and ACE Asia scientists in model validations, intercomparisons of measurements, and chemistry/transport process studies.
- UV DIAL TRACE-P Ozone and Aerosol Data Images:
<http://asd-www.larc.nasa.gov/lidar/lidar.html/datasets.html>
(name and password is same as for access to TRACE-P data archive)

TRACE-P Ozone Comparison (DIAL - In Situ)



Comparison of TRACE-P & PEM West B Average Longitudinal Ozone Distributions

